

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Martin F. Schlecht

Continuation Application of

Application No.: 10/359,457

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For: HIGH EFFICIENCY POWER CONVERTER

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EXPRESS MAIL LABEL NO. EV 214952316 US

SUPPLEMENT TO INFORMATION DISCLOSURE STATEMENT

Mail Stop PATENT APPLICATION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Prior to the claimed invention, the inventor was involved in the development of power converter electronics as a professor at Massachusetts Institute of Technology (MIT). Following is a brief description of that technology which is owned by MIT.

Energy recovery was the goal of work with Leo F. Casey. That work was published in the following three documents:

1. U.S. Patent 4,788,634;
2. "A High Frequency, Low Volume, Point-of-Load Power Supply for Distributed Power System," Proceedings of the 18th Annual IEEE Power Electronics Specialist Conference, June 21-26, 1987;
3. MIT Doctoral Thesis of Leo Francis Casey, "Circuit Design for 1-10 MHZ DC/DC Conversion" of, January 1989.

In the Casey work, diode rectifiers were used in the secondary, although references to synchronous rectifiers were made. In the doctoral thesis, note pages 73-80 and 198-201. Also

note the reference to post regulation using synchronous rectifiers at pages 205-207. The Casey work used resonant converters, that is, transitions in the primary and secondary winding voltage waveforms occurred slowly over full cycles (see Figure 8.4(b) of the thesis).

The remaining work was directed to efficient, nonresonant DC-DC converters:

1. Masters thesis of Andrew Ferencz, "A 250 W High Density Point of Load Converter," September 1989;
2. Masters thesis of John Mburu Gachora, "Design of a Four-Phase Switchmode High Efficiency Power Supply," May 1994;
3. MIT Report to IBM, "Research Results from the Study of A High Efficient, Highly Manufacturable DC-DC Converter."


Regulation and isolation stages were separated, a feature of the present invention. Diode rectifiers were in the secondary circuit. The primary voltage waveforms had fixed duty cycles and transition times which were short relative to on-state and off-state times of the diode rectifiers. Note, for example, the Ferencz thesis at page 22. In a paragraph bridging pages 23 and 24, reference to the possible use of synchronous rectifiers was considered but rejected in favor of Schottky diodes.

The report to IBM, a research sponsor, was not published. It is work by the inventor of the present application, Dr. Martin F. Schlecht, and is thus not believed to be prior art. However, the claims of the present invention distinguish the work of that report since the work of the report is owned by MIT, and the present application is not. Like the Ferencz and Gachora publications, the IBM report suggests separate regulation and isolation stages with diode rectifiers. The use of synchronous rectifiers to reduce power loss is suggested at page 17 of that report. More specifically, JFETs are suggested. JFETs do not have parallel uncontrolled rectifiers.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By


James M. Smith, Esq.

Registration No. 28,043

Telephone (978) 341-0036

Facsimile (978) 341-0136

Concord, Massachusetts 01742-9133

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